

What is claimed is:

1. A refrigeration cycle system comprising:

a compressor for compressing and discharging a refrigerant;

a condenser for condensing the refrigerant discharged from the refrigerant compressor to a liquid refrigerant;

a liquid refrigerant receiver for separating the refrigerant delivered from the refrigerant condenser into a liquid refrigerant and a gaseous refrigerant and allowing only the liquid refrigerant to be delivered;

a variable throttle valve defining a valve hole through which the liquid refrigerant delivered from the liquid refrigerant receiver passes;

a valve body for adjusting an area of opening of the valve hole;

a refrigerant evaporator for evaporating the refrigerant having been adiabatically expanded upon passing through the valve hole of the variable throttle valve; and

a refrigerant-to-refrigerant heat exchanger for exchanging heat between a high pressure refrigerant delivered from said liquid refrigerant receiver and a low pressure refrigerant delivered from said refrigerant evaporator, said refrigeration cycle system wherein

said variable throttle valve reduces an area of opening or a degree of throttle opening of said valve hole or an amount of lift of said valve body as a level of subcooling of a refrigerant delivered from said refrigerant-to-refrigerant heat exchanger increases or has increased to a predetermined value or more, and

said variable throttle valve increases the area of opening

or the degree of throttle opening of said valve hole or the amount of lift of said valve body as the level of subcooling of the refrigerant delivered from said refrigerant-to-refrigerant heat exchanger decreases or has reduced to the predetermined value or less.

2. The refrigeration cycle system according to claim 1, wherein

said variable throttle valve is disposed downstream of said refrigerant-to-refrigerant heat exchanger and upstream of said refrigerant evaporator.

3. The refrigeration cycle system according to claim 1, said refrigerant-to-refrigerant heat exchanger further comprising:

a first refrigerant conduit through which a high pressure refrigerant delivered from said liquid refrigerant receiver and directed to said variable throttle valve flows and a second refrigerant conduit through which a low pressure refrigerant delivered from said refrigerant evaporator and directed to said refrigerant compressor flows.

4. The refrigeration cycle system according to claim 3, wherein

said refrigerant-to-refrigerant heat exchanger is a double-pipe refrigerant-to-refrigerant heat exchanger with an outer circumferential surface of one of said first and second refrigerant conduits being surrounded with the other refrigerant conduit.

5. The refrigeration cycle system according to claim 3, wherein

said refrigerant-to-refrigerant heat exchanger is a double-layer refrigerant-to-refrigerant heat exchanger with one end face of one of said first and second refrigerant conduits being in close contact with one end face of the other refrigerant conduit.

6. The refrigeration cycle system according to claim 3, further comprising:

a pipe joint or a block for connecting between the first refrigerant conduit of said refrigerant-to-refrigerant heat exchanger and an inlet pipe of said refrigerant evaporator, wherein

a high pressure refrigerant passageway, through which a high pressure refrigerant flows, is defined within said pipe joint or said block, and

said variable throttle valve is incorporated in said high-pressure refrigerant passageway.

7. The refrigeration cycle system according to claim 3, wherein

a high pressure refrigerant passageway through which a high pressure refrigerant flows is defined within said first refrigerant conduit of said refrigerant-to-refrigerant heat exchanger, and

said variable throttle valve is incorporated in said high-pressure refrigerant passageway.

8. The refrigeration cycle system according to claim 3, said

variable throttle valve further comprising:

means for driving said valve body having a first pressure chamber in which a medium for converting a change in temperature of a refrigerant delivered from the first refrigerant conduit of said refrigerant-to-refrigerant heat exchanger to a pressure change is encapsulated, a second pressure chamber to which the refrigerant delivered from the first refrigerant conduit of said refrigerant-to-refrigerant heat exchanger exerts a high pressure, and a diaphragm to be displaced in response to a pressure difference between an internal pressure of said first pressure chamber and an internal pressure of said second pressure chamber, and

means for biasing said valve body to a close position, said valve body drive means having a biasing force of said valve body bias means to drivingly close said valve body when a level of subcooling of a refrigerant introduced into the valve hole of said variable throttle valve increases and the internal pressure of said first pressure chamber is lower than the internal pressure of said second pressure chamber, and

said valve body drive means drivingly opens said valve body against the biasing force of said valve body bias means when the level of subcooling of a refrigerant introduced into the valve hole of said variable throttle valve decreases and the internal pressure of said first pressure chamber is higher than the internal pressure of said second pressure chamber.

9. The refrigeration cycle system according to claim 3, further comprising:

an air conditioning unit for air-conditioning a passenger compartment of a vehicle, wherein

said refrigerant evaporator for exchanging heat between a refrigerant drawn from said variable throttle valve and air, and a hot-water heater for exchanging heat between cooling water for cooling an engine and air are disposed within an air conditioning casing of said air conditioning unit.

10. The refrigeration cycle system according to claim 9, further comprising:

a first refrigeration cycle allowing a refrigerant discharged from said refrigerant compressor to pass through said condenser and said liquid refrigerant receiver and thereafter return through the first refrigerant conduit of said refrigerant-to-refrigerant heat exchanger, said variable throttle valve, said refrigerant evaporator, and said second refrigerant conduit of said refrigerant-to-refrigerant heat exchanger to said refrigerant compressor,

a second refrigeration cycle allowing a refrigerant discharged from said refrigerant compressor to bypass said refrigerant condenser and said liquid refrigerant receiver and thereafter return through the first refrigerant conduit of said refrigerant-to-refrigerant heat exchanger, said variable throttle valve, said refrigerant evaporator, and said second refrigerant conduit of said refrigerant-to-refrigerant heat exchanger to said refrigerant compressor, and

cycle switching means for switching between said first

refrigeration cycle and said second refrigeration cycle.